

| <b>Notice of Allowability</b> | <b>Application No.</b> | <b>Applicant(s)</b> |  |
|-------------------------------|------------------------|---------------------|--|
|                               | 09/898,708             | BABKA ET AL.        |  |
|                               | <b>Examiner</b>        | Art Unit            |  |
|                               | Cam Y T. Truong        | 2162                |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1.  This communication is responsive to 10/26/2005.
2.  The allowed claim(s) is/are 1 and 3-41.
3.  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a)  All
  - b)  Some\*
  - c)  None
  1.  Certified copies of the priority documents have been received.
  2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3.  Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4.  A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5.  CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a)  including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1)  hereto or 2)  to Paper No./Mail Date \_\_\_\_\_.
  - (b)  including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6.  DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

#### Attachment(s)

1.  Notice of References Cited (PTO-892)
2.  Notice of Draftperson's Patent Drawing Review (PTO-948)
3.  Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date \_\_\_\_\_
4.  Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5.  Notice of Informal Patent Application (PTO-152)
6.  Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_.
7.  Examiner's Amendment/Comment
8.  Examiner's Statement of Reasons for Allowance
9.  Other \_\_\_\_\_.

**DETAILED ACTION**

1. Applicant has amended claims 1, 3-4, 18, 20-23, 29, 33, 35 and canceled claim 2 in the amendment filed on 10/26/2005.

Claims 1 and 3-41 are pending in this Office Action.

***Drawings***

2. Drawing filed on 7/3/2001 is accepted.

**EXAMINER'S AMENDMENT**

3. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Attorney Steven A. Gilliam on 1/4/2005.

**In the Specification:**

Please replace the paragraph [1015] of the specification on page 8 as the following:

[1015] Systems, structures and techniques described herein provide a mechanism for transforming, representing and/or manipulating hierarchically-organized data in a way that efficiently identifies and/or encodes identical or equivalent instances. In this way, applications and other software systems that efficiently handle such data organizations are facilitated. Trees (typically implemented as a hierarchy of nodes

traversed using pointer chains) are but one example of a hierarchically-organized data structure. In particular, persons of ordinary skill in the art will recognize that other encodings may be hierarchical in organization. For example, without limitation serialized or string encodings may exhibit hierarchical organization. In particular, both information encoded using markup languages (e.g., XML) and information encoded as lists of lists often exhibit hierarchical organization. Although the description that follows employs illustrative hierarchical data organizations that may resemble traditional, pointer traversed tree structure of nodes, persons of ordinary skill in the art will recognize that such data organizations and associated encodings and operations are merely illustrative and the scope of the present invention is not limited thereto. At least one computer readable medium is selected from the set of a disk, tape, other magnetic, optical and electronic storage medium. Rather, the invention is defined by the claims that follow.

**In claims:**

Please replace claims 29, 34 and 41 with amended claims 29, 34 and 41.

29. (Currently Amended) A computer implemented method of representing hierarchically-organized data, the method comprising:

recursively collapsing sub-hierarchies of the hierarchically-organized data using encodings, wherein the encodings include orthogonal values;

representing any given node of the hierarchically-organized data as a concatenation of node-specific information with a combination of the orthogonal values for each collapsed sub-hierarchy beneath the given node,

wherein the collapsing is order-insensitive with respect to the encodings.

34. (Currently amended) The computer program product of claim 33, wherein the at least one computer readable medium is selected from the set of a disk, tape, other magnetic, optical, and electronic storage medium.

41 (Currently amended) An apparatus for identifying equivalent portions of one or more unsorted hierarchically-organized data structures comprising:

means for collapsing plural nodes of one or more unsorted hierarchically-organized data structures into respective representations, wherein each of the respective representations incorporate information of a respective node and information of any child nodes of the respective node;

wherein the collapsing means is order-insensitive with respect to information of the respective child nodes,

wherein the collapsed representations include respective aggregations of orthogonally-encoded child node information; and

means for identifying equivalent portions of the one or more unsorted hierarchically-organized data structures based on correspondence of particular instances of the collapsed representations.

***Allowable Subject Matter***

6. Claims 1, 3-41 is allowed.

The prior art of record, alone or in combination, does not teach or fairly suggest the combination of steps as recited in independent claim 1, wherein “wherein the collapsing is order-insensitive with respect to information of the respective child node, based on correspondence of particular instances of the collapsed representations, identifying the respective portions as equivalent, wherein the collapsed representations include respective aggregations of orthogonally-encoded child node information”;

The prior art of record, alone or in combination, does not teach or fairly suggest the combination of steps as recited in independent claim 18, wherein “wherein the selected identifiers and combining function ensure that same combinations of child node identifiers result in same child nodes contributions irrespective of ordering of the child node identifiers, and wherein for a second level of the tree, respective child nodes are the leaf nodes of the first-level of the tree”;

The prior art of record, alone or in combination, does not teach or fairly suggest the combination of steps as recited in independent claim 29, wherein “representing any given node of the hierarchically-organized data as a concatenation of node-specific information with a combination of the orthogonal values for each collapsed sub-hierarchy beneath the given node, wherein the collapsing is order-insensitive with respect to the encodings”;

The prior art of record, alone or in combination, does not teach or fairly suggest the combination of steps as recited in independent claim 33, wherein “an object

implementing the counterpart data structure including at least one table wherein values of the at least one table provide the orthogonal encodings and keys, wherein the keys combine the information of respective nodes with an aggregation of the collapsed representations for child nodes of the respective nodes.

The prior art of record, alone or in combination, does not teach or fairly suggest the combination of steps as recited in independent claim 35, wherein “collapsing plural nodes of the hierarchically-organized into respective representations that each incorporate information of a respective node and information of any child nodes of the respective node, wherein the collapsing includes an order-insensitive aggregation of orthogonal encodings of information of the respective child nodes”; and

The prior art of record, alone or in combination, does not teach or fairly suggest the combination of steps as recited in independent claim 41, wherein “wherein the collapsing means is order-insensitive with respect to information of the respective child nodes, wherein the collapsed representations include respective aggregations of orthogonally-encoded child node information; and means for identifying equivalent portions of the one or more unsorted hierarchically-organized data structures based on correspondence of particular instances of the collapsed representations”.

The dependent claims, bring definite, further limiting, and fully enabled by the specification are also allowed.

### Contact Information

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cam Y T. Truong whose telephone number is (571) 272-4042. The examiner can normally be reached on Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Breene can be reached on (571) 272-4107. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Cam Y T Truong  
Patent Examiner  
Art Unit 2162  
1/5/2005